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Job No.: CACE/BBMP/SS/W.No.14/2022-23 Date : 05.04.2022

GRADATION FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2386 (Part 1):1963(RA 2011)

Date of Testing : 05.04.2022

Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	189	189	1.9	98.1	95-100
22.4	2530	2719	27.2	72.8	60-80
11.2	2165	4884	48.8	51.2	40-60
4.75	1852	6736	67.4	32.6	25-40
2.36	1163	7899	79.0	21.0	15-30
0.600	584	8483	84.8	15.2	8-22
0.075	1219	9702	97.0	3.0	0-5

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Authorised Signatory

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

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IS Code: : IS 2386 (Part 1):1963(RA 2011)

Date of Testing : 05.04.2022

Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	168	168	1.7	98.3	95-100
22.4	2536	2704	27.0	73.0	60-80
11.2	2158	4862	48.6	51.4	40-60
4.75	1836	6698	67.0	33.0	25-40
2.36	1168	7866	78.7	21.3	15-30
0.600	515	8381	83.8	16.2	8-22
0.075	1256	9637	96.4	3.6	0-5

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GRADATION FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2386 (Part 1):1963(RA 2011)

Date of Testing : 05.04.2022

Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	175	175	1.8	98.3	95-100
22.4	2595	2770	27.7	72.3	60-80
11.2	2145	4915	49.2	50.9	40-60
4.75	1836	6751	67.5	32.5	25-40
2.36	1185	7936	79.4	20.6	15-30
0.600	536	8472	84.7	15.3	8-22
0.075	1265	9737	97.4	2.6	0-5

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Job No.: CACE/BBMP/SS/W.No.14/2022-23 Date : 05.04.2022

GRADATION FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2386 (Part 1):1963(RA 2011)

Date of Testing : 05.04.2022

Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	174	174	1.7	98.3	95-100
22.4	2498	2672	26.7	73.3	60-80
11.2	2165	4837	48.4	51.6	40-60
4.75	1896	6733	67.3	32.7	25-40
2.36	1156	7889	78.9	21.1	15-30
0.600	536	8425	84.3	15.8	8-22
0.075	1265	9690	96.9	3.1	0-5

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date: 03.05.2022

Aggregate Gradation Test

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri. Shivalingaiah Satish, Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	03.05.2022

Total Weight of Sample: 10000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.50	710	7.1	7.10	92.90	90 - 100	
19.00	1265	12.7	19.75	80.25	71 - 95	
13.20	1384	13.8	33.59	66.41	56 - 80	
4.75	2510	25.1	58.69	41.31	38 - 54	
2.36	1036	10.4	69.05	30.95	28 - 42	
0.300	1365	13.7	82.70	17.30	7 - 21	
0.075	1156	11.6	94.26	5.74	2 - 8	

Total Weight of Sample: 10000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.5	689	6.9	6.89	93.11	90 - 100	
19	1420	14.2	21.09	78.91	71 - 95	
13.2	1168	11.7	32.77	67.23	56 - 80	
4.75	2412	24.1	56.89	43.11	38 - 54	
2.360	1184	11.8	68.73	31.27	28 - 42	
0.300	1365	13.7	82.38	17.62	7 - 21	
0.075	1163	11.6	94.01	5.99	2 - 8	

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JobNo: CACE/BBMP/SS/W.No.14/2022-23

Date : 03.05.2022

TEST RESULTS OF AGGREGATE SHAPE TEST (Flakiness & Elongation)

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

BIS Code : IS 2386 Part (1):1963

Date of Test : 03.05.2022

Type of Mix : Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	11.20	13.50	24.70	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	11.90	13.90	25.80	

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ಬೆಂಗಳೂರು 560073

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Job No: CACE/BBMP/SS/W.No.14/2022-23 Date : 03.05.2022

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

Source / Location : Hot Mix Plant, Bangalore

BIS Code : IS 2386 Part (4):1963

Type of Mix : Dense Graded Bituminous Macadam

Date of test : 03.05.2022

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	382	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W2 g	85	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	297	297	
5	Aggregate Impact value = percent fines 100* (W2/W1) percent	22.25	22.66	**22.45**

Comments:

→ Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)

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Job No: CACE/BBMP/SS/W.No.14/2022-23 Date: 03.05.2022

TEST REPORT ON PAVING BITUMEN

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS Code	IS 73:2013,IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing	**03.05.2022**
Type of Mix	**Dense Graded Bituminous Macadam , VG 30**
Source of Location	**Hot Mix Plant**

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	50	Min 45
2	Softening point, 0C	48	Min 47
3	Ductility at 250C, cm	99	Min40
4	Flash Point, 0C	288	Min 220

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date: 05.05.2022

Specific Gravity And Water Absorption Test

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	03.05.2022 to 05.05.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2024	2026	
2	Weight of basket suspended in water	W_2 g	754	754	754	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1270	1272	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2017	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	747	747	
6	Weight of oven dried aggregate	W_4 g	2010	2011	2012	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.684	2.692	2.693	2.690
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.702	2.714	2.719	2.711
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.25%	0.30%	0.35%	0.30%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%(As per MORTH table 500.8)

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date: 09.05.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the Work	:	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	09.05.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.62	10.54	9 Kn (min)
2	Marshal flow, mm	2.39	3.12	2 – 4
3	Percent air voids in Mineral Aggregate	13.84	14.55	13 – 15
4	Voids in Compacted Mix	3.46	4.11	3 – 6
5	Percent Voids filled with Bitumen	69.98	70.54	65 - 75
6	Density, g/cc	2.25	2.27	--

Note:

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date: 09.05.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri. Shivalingaiah Satish, Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
Date of Testing	09.05.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.5	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.50	23.00
7. Bitumen content in %	4.50	4.60
8. Average	4.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.10
37.5	0	0	0	100	100
26.5	34.2	34.2	7.2	92.8	90 - 100
19	70.6	104.8	21.9	78.1	71 - 95
13.2	62.8	167.6	35.1	64.9	56 - 80
4.75	83.4	251	52.6	47.4	38 - 54
2.360	70.3	321.3	67.3	32.7	28 - 42
0.300	95.2	416.5	87.2	12.8	7 - 21
0.075	36.5	453	94.9	5.1	2 - 8

SIEVE SIZE	Test 2				
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.10
37.5	0	0	0	100	100
26.5	35.9	35.9	7.5	92.5	90 - 100
19	72.4	108.3	22.7	77.3	71 - 95
13.2	65.3	173.6	36.4	63.6	56 - 80
4.75	80.30	253.9	53.2	46.8	38 - 54
2.360	75.9	329.8	69.1	30.9	28 - 42
0.300	92.2	422	88.5	11.5	7 - 21
0.075	25.6	447.6	93.8	6.2	2 - 8

Note:

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For CIVIL AIM CONSULTANTS & ENGINEERS

Authorised Signatory

No. 01, Satvika Nilaya, Opp. Wide Poorna Prajna School,
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Job No.: CACE/BBMP/SS/W.No.14/2021-22

Aggregate Gradation Test

IS : 2386 Part I

Date : 04.05.2022

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri. Shivalingaiah Satish, Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS Code	IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	04.05.2022

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	415	8.30	8.30	91.70	90 - 100	
9.5	482	9.64	17.94	82.06	70 - 88	
4.75	630	12.60	30.54	69.46	53 - 71	
2.36	689	13.78	44.32	55.68	42 - 58	
1.18	526	10.52	54.84	45.16	34 - 48	
0.600	544	10.88	65.72	34.28	26 - 38	
0.300	482	9.64	75.36	24.64	18 - 28	
0.150	365	7.30	82.66	17.34	12 - 20	
0.075	486	9.72	92.38	7.62	4 - 10	

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	423	8.46	8.46	91.54	90 - 100	
9.5	542	10.84	19.30	80.70	70 - 88	
4.75	689	13.78	33.08	66.92	53 - 71	
2.36	530	10.60	43.68	56.32	42 - 58	
1.18	549	10.98	54.66	45.34	34 - 48	
0.600	546	10.92	65.58	34.42	26 - 38	
0.300	682	13.64	79.22	20.78	18 - 28	
0.150	198	3.96	83.18	16.82	12 - 20	
0.075	482	9.64	92.82	7.18	4 - 10	

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Job No.: CACE/BBMP/SS/W.No.14/2022-23 Date: 04.05.2022

Aggregate Impact Value

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	04.05.2022

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86.5	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299.5	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.14	22.41	**22.27**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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ಬೆಂಗಳೂರು 560073

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Job No.: CACE/BBMP/SS/W.No.14/2022-23 Date: 04.05.2022

TEST REPORT

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the work	:	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	04.05.2022

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	47	Min 45
2	Softening point, ^{0}C	50	Min. 47
3	Ductility at 27^{0}C, cm	> 100	Min. 40
4	Flash Point, ^{0}C	282	Min. 220

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Date : 04.05.2022

Job No.: CACE/BBMP/SS/W.No.14/2021-22

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	04.05.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.5	11.8	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	12.9	13.1	
	Combined Flakiness & Elongation index	24.40	24.90	

Note:

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date : 06.05.2022

Specific Gravity And Water Absorption Test

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	04.05.2022 to 06.05.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2022	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1265	1267	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2017	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	750	750	750	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.679	2.680	2.681	2.680
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.700	2.705	2.710	2.705
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.35%	0.40%	0.35%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date : 05.04.2022

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS code:	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	05.04.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 400.12
1	Flakiness Index %	12.10	12.60	Combined Flakiness & Elongation index Max 35%
2	Elongation Index %	13.30	13.90	
	Combined Flakiness & Elongation index	25.40	26.50	

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date : 05.04.2022

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
BIS code:	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	05.04.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 400.12
1	Flakiness Index %	11.90	12.40	Combined Flakiness & Elongation index Max 35%
2	Elongation Index %	13.20	13.50	
	Combined Flakiness & Elongation index	25.10	25.90	

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ಪೂರ್ವ ದಾಸರಹಳ್ಳಿ ಉಪ ವಿಭಾಗ
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Job No.: CACE/BBMP/SS/W.No.14/2022-23 Date : 07.04.2022

ATTERBERG LIMITS TEST FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2720(Part 5):1985

Date of Testing : 05.04.2022 to 07.04.2022

Material Type : Wet Mix Macadam

SL No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	20.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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ATTERBERG LIMITS TEST FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2720(Part 5):1985

Date of Testing : 05.04.2022 to 07.04.2022

Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	20.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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ATTERBERG LIMITS TEST FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2720(Part 5):1985

Date of Testing : 05.04.2022 to 07.04.2022

Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	19.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Date : 07.04.2022

ATTERBERG LIMITS TEST FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2720(Part 5):1985

Date of Testing : 05.04.2022 to 07.04.2022

Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	19.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date : 07.04.2022

ATTERBERG LIMITS TEST FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2720(Part 5):1985

Date of Testing : 05.04.2022 to 07.04.2022

Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	21.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

Note:

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ಬಾ.ಮಹಾನಗರ ಪಾಲಿಕೆ
ಬೆಂಗಳೂರು

For CIVIL AIM CONSULTANTS & ENGINEERS

Authorised Signatory

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Ramaiah Layout, Nagasandra, Bangalore - 560 073.
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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date : 05.04.2022

GRADATION FOR WMM

Client : **Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Sri. Shivalingaiah Satish,** Contractor, Bangalore.

Name of Work : Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.

IS Code: : IS 2386 (Part 1):1963(RA 2011)

Date of Testing : 05.04.2022

Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	192	192	1.9	98.1	95-100
22.4	2436	2628	26.3	73.7	60-80
11.2	2145	4773	47.7	52.3	40-60
4.75	1825	6598	66.0	34.0	25-40
2.36	1163	7761	77.6	22.4	15-30
0.600	545	8306	83.1	16.9	8-22
0.075	1512	9818	98.2	1.8	0-5

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Date: 05.04.2022

Aggregate Impact Value

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri. Shivalingaiah Satish, Contractor, Bangalore.
Name of the Work	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
IS Code	IS 2386 (Part 4):1963(RA 2011)
Type of Mix	Wet Mix macadam
Date of Testing	05.04.2022

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	295	295	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.57	22.98	22.77

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%(As per MORTH Specication table 400.12)

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date: 10.05.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the Work	:	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	10.05.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.12	10.85	9 Kn (min)
2	Marshal flow, mm	2.24	3.56	2 – 4
3	Percent air voids in Mineral Aggregate	13.21	14.66	13 – 15
4	Voids in Compacted Mix	3.89	4.75	3 – 6
5	Percent Voids filled with Bitumen	70.58	71.78	65 - 75
6	Density, g/cc	2.25	2.26	--

Note:

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date : 10.05.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri. Shivalingaiah Satish, Contractor, Bangalore.
NAME OF THE WORK	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	10.05.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472	472.5
3. Weight of Asphalt and Mineral matter Extracted, g	28	27.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	28	27.5
7. Bitumen content in %	5.60	5.50
8. Average	5.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	15.5	15.5	3.3	96.7	90 - 100
9.5	60.9	76.4	16.2	83.8	70 - 88
4.75	92.6	169	35.8	64.2	53 - 71
2.36	45.6	214.6	45.5	54.5	42 - 58
1.18	36.8	251.4	53.3	46.7	34 - 48
0.600	52.4	303.8	64.4	35.6	26 - 38
0.300	49.2	353	74.8	25.2	18 - 28
0.150	36.8	389.8	82.6	17.4	12 - 20
0.075	50.2	440	93.2	6.8	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.9	12.9	2.7	97.3	90 - 100
9.5	62.3	75.2	15.9	84.1	70 - 88
4.75	95.6	170.8	36.1	63.9	53 - 71
2.36	46.8	217.6	46.1	53.9	42 - 58
1.18	52.4	270	57.1	42.9	34 - 48
0.600	49.2	319.2	67.6	32.4	26 - 38
0.300	36.8	356	75.3	24.7	18 - 28
0.150	35.2	391.2	82.8	17.2	12 - 20
0.075	40.2	431.4	91.3	8.7	4 - 10

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Job No.: CACE/BBMP/SS/W.No.14/2022-23

Date: 11.05.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri. Shivalingaiah Satish,** Contractor, Bangalore.
Name of the Work	:	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	11.05.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.36	9.84	9 Kn (min)
2	Marshal flow, mm	2.22	3.65	2 – 4
3	Percent air voids in Mineral Aggregate	13.48	14.52	13 – 15
4	Voids in Compacted Mix	3.89	4.12	3 – 6
5	Percent Voids filled with Bitumen	66.98	67.79	65 - 75
6	Density, g/cc	2.25	2.26	--

Note:

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Job No.: CACE/BBMP/SS/W.No.14/2022-23 Date : 11.05.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri. Shivalingaiah Satish, Contractor, Bangalore.
NAME OF THE WORK	Improvements to drains and Providing Asphalting to roads at Bhuvaneshwari Nagara 8th main and Surroundings in Ward No.14 Bagalagunte, BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	11.05.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	472
3. Weight of Asphalt and Mineral matter Extracted, g	27	28
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	28
7. Bitumen content in %	5.40	5.60
8. Average	5.50	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	14.8	14.8	3.1	96.9	90 - 100
9.5	66.3	81.1	17.1	82.9	70 - 88
4.75	90.5	171.6	36.3	63.7	53 - 71
2.36	46.2	217.8	46.0	54.0	42 - 58
1.18	35.8	253.6	53.6	46.4	34 - 48
0.600	50.3	303.9	64.2	35.8	26 - 38
0.300	46.5	350.4	74.1	25.9	18 - 28
0.150	33.5	383.9	81.2	18.8	12 - 20
0.075	52.4	436.3	92.2	7.8	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	14.6	14.6	3.1	96.9	90 - 100
9.5	66.8	81.4	17.2	82.8	70 - 88
4.75	90.4	171.8	36.4	63.6	53 - 71
2.36	42.6	214.4	45.4	54.6	42 - 58
1.18	46.98	261.38	55.4	44.6	34 - 48
0.600	55.3	316.68	67.1	32.9	26 - 38
0.300	43.8	360.48	76.4	23.6	18 - 28
0.150	35.6	396.08	83.9	16.1	12 - 20
0.075	40.9	436.98	92.6	7.4	4 - 10

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